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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/910,108 | 07/20/2001 | Takashi Yamanaka | S004-4348 | 1685 |

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| EXAMINER | |
|---|---|
| LI, SHI K | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2633 | |

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/910,108 | YAMANAKA ET AL. | |
| | Examiner | Art Unit | |
| | Shi K. Li | 2633 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *28 October 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *18-53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18-32 and 34-53* is/are rejected.

7)☒ Claim(s) *33* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 October 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Priority*

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 27 July 2000. It is noted, however, that applicant has not filed a certified copy of the 2000-227380 application as required by 35 U.S.C. 119(b).

### *Claim Objections*

2. Claim 36 is objected to because of the following informalities: Claim 36 recites "A method of controlling an optical communication device according to claim 18" in lines 1-2 of the claim. However, claim which intended to embrace both apparatus and method is precluded by language of 35 U.S.C 101, which set forth statutory classes of invention in alternative only. See Ex parte Lyell, 17 USPQ2d 1548 (Bd. PA&I 1990). It is suggested that claim 36 be rewritten to characterize the method step as a function of the driving control means. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 18, 24-25, 34-35, 37-38, 47-49 are rejected under 35 U.S.C. 102(e) as being anticipated by Jing (U.S. Patent 6,259,835 B1).

Regarding claims 18, 24-25, 37-38 and 49, Jing discloses in FIG. 5 an optical switch comprising a light beam from reflector 110a to reflector 110e, a plurality of optical parts 110b, 110c and 110d disposed on opposite sides of the light beam path, actuators (corresponding to driving means of instant claim) for independently driving each of the optical part between an "ON" position and an "OFF" position, and a control circuit (corresponding to driving control means of instant claim) for controlling the actuators.

Regarding claims 34-35 and 47-48, Jing teaches in col. 2, lines 63-64 that the reflectors can be prisms or mirrors.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 18-25, 32, 36-38, 42-46 and 51-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukushima (U.S. Patent 5,805,759) in view of Bornhorst (U.S. Patent 6,769,792 B1).

Regarding claims 18 and 37-38, Fukushima discloses in FIG. 16 an optical equalizer comprising diffraction grating 22 for propagating a light beam through a space, a movable attenuating plate 6, wave plate 90, polarizer plate 92, and drivers 32 and 34. Fukushima further teaches in FIG. 15 a processor for controlling the optical equalizer. The difference between Fukushima and the claimed invention is that Fukushima does not teach to dispose the attenuating plates on opposite sides of the light beam path. Bornhorst teaches in FIG. 7 to use colors wheels

220A, 220B and 220C for filtering light. Bornhorst teaches in FIG. 7 to dispose the optical plates on opposite sides of the light beam path. One of ordinary skill in the art would have been motivated to combine the teaching of Bornhorst with the optical equalizer of Fukushima because the arrangement of Bornhorst is compact. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to dispose the optical plates at opposite sides of the light beam, as taught by Bornhorst, in the optical equalizer of Fukushima because such arrangement is compact.

Regarding claims 19-22, 42-45 and 51-53, Fukushima teaches in FIG. 9 a plurality of attenuating plates 6(#1-#4) and in col. 11, lines 23-27 that each attenuating plate can have arbitrary wavelength characteristics to obtain arbitrary shaped wavelength characteristics as illustrated in FIG. 10 and FIG. 11. One of ordinary skill in the art would have been motivated to combine the teaching of FIG. 9 of Fukushima with the modified optical equalizer of Fukushima FIG. 16 and Bornhorst because a plurality plates give fine control of the wavelength characteristics. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a plurality attenuating plates with various wavelength characteristics to fine control the light bema, as taught by FIG. 9 of Fukushima, in the modified optical equalizer of Fukushima and Bornhorst because it give fine control of the wavelength characteristics.

Regarding claims 23 and 46, Fukushima teaches in col. 14, lines 1-5 and FIG. 17(B) that polarization plate 92 includes block region 92C that can be used to block light beam.

Regarding claim 24, Fukushima teaches in col. 10, lines 63-64 that the driver 32' individually moves and positions attenuator plates 6 (#1 to #4).

Regarding claim 25, Bornhorst teaches in FIG. 7 to arrange filters in a zig-zag pattern on opposite sides of the light beam path.

Regarding claim 32, Fukushima illustrates in FIG. 3 that the optical parts 6 is supported by mechanism inside driver 32.

Regarding claim 36, Fukushima uses a single driver to simultaneously drive the attenuating plates.

7. Claims 26-28, 30, 39-40 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukushima and Bornhorst as applied to claims 18-25, 32, 36-38, 42-46 and 51-53 above, and further in view of Wakabayashi et al. (U.S. Patent 6,469,421 B1).

Fukushima and Bornhorst have been discussed above in regard to claims 18-25, 32, 36-38, 42-46 and 51-53. Regarding claims 26-27, 39 and 50, the difference between Fukushima and Bornhorst and the claimed invention is that Fukushima and Bornhorst do not teach to use piezoelectric actuator. Wakabayashi et al. teaches in FIG. 17 a piezoelectric actuator with vibrator 6 and moving body 7 frictionally driven by the vibrator via friction material 8. One of ordinary skill in the art would have been motivated to combine the teaching of Wakabayashi et al. with the modified optical equalizer of Fukushima and Bornhorst because, in general, piezoelectric actuators have high precision and are light in weight, and in particular, the piezoelectric actuator of Wakabayashi et al. is stable and simple in production process (see col. 2, lines 45-48). Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the piezoelectric actuator of Wakabayashi et al. in the optical equalizer of Fukushima because it is small, stable and simple in production process.

Regarding claims 28 and 40, the piezoelectric actuator of Wakabayashi et al. is of a rotating type.

Regarding claim 30, it is obvious that an initial configuration may be desirable and a preliminary signal can be used to set up such initial configuration in the modified optical equalizer of Fukushima and Wakabayashi et al.

8. Claims 26-29 and 39-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukushima and Bornhorst as applied to claims 18-25, 32, 36-38, 42-46 and 51-53 above, and further in view of Slutskiy et al. (U.S. Patent 6,384,514 B1).

Fukushima and Bornhorst have been discussed above in regard to claims 18-25, 32, 36-38, 42-46 and 51-53. The difference between Fukushima and Bornhorst and the claimed invention is that Fukushima and Bornhorst do not teach to use piezoelectric actuator. Slutskiy et al. teaches in FIG. 1 and FIG. 2 a piezoelectric actuator for generating rotational and linear motions, respectively. The piezoelectric actuator of Slutskiy et al. vibrates and transfers motion to rotor or slider via friction. One of ordinary skill in the art would have been motivated to combine the teaching of Slutskiy et al. with the modified optical communication device of Fukushima and Bornhorst because the piezoelectric actuator of Slutskiy et al. is small, light weight and reliable. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a piezoelectric actuator, as taught by Slutskiy et al., in the modified optical communication device of Fukushima and Bornhorst because the piezoelectric actuator of Slutskiy et al. is small, light weight and reliable.

9. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukushima and Bornhorst and Wakabayashi et al. as applied to claims 26-28, 30, 39-40 and 50 above, and further in view of Iino et al. (U.S. Patent 6,144,140).

Fukushima and Bornhorst and Wakabayashi et al. have been discussed above in regard to claims 26-28, 30, 39-40 and 50. The difference between Fukushima and Bornhorst and Wakabayashi et al. and the claimed invention is that Fukushima and Bornhorst and Wakabayashi et al. do not teach a driving circuit for the piezoelectric actuator. Iino et al. teaches a self-excited oscillating circuit for piezoelectric actuator in FIG. 3. One of ordinary skill in the art would have been motivated to combine the teaching of Iino et al. with the modified optical communication device of Fukushima and Bornhorst and Wakabayashi et al. because self-exciting circuit is simple (see col. 1, line 13). Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a self-excited oscillating circuit for driving the piezoelectric actuator, as taught by Iino et al., in the modified optical communication device of Fukushima and Bornhorst and Wakabayashi et al. because it is simple.

***Allowable Subject Matter***

10. Claim 33 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

11. Applicant's arguments with respect to claims 18-32 and 34-53 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shi K. Li whose telephone number is 571 272-3031. The examiner can normally be reached on Monday-Friday (8:30 a.m. - 5:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

skl
24 March 2005

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